

**IN THE ABSTRACT:**

Please delete the entire Abstract, and replace with the following new Abstract:

## ABSTRACT OF THE DISCLOSURE

A method and a device determine a physical property of a medium, such as a concentration of a substance in the medium. The device includes a light source; a probe with optical fibers positioned alongside each other, with a first optical fiber delivering radiation from the light source to a sample and collecting first backscattered radiation from the sample, and with a second optical fiber collecting second backscattered radiation; a spectrometer for producing first and second signals based on the first and second backscattered radiation; and a processor which determines a differential backscatter signal from the first and second signals and to calculate the physical property by curve fitting the measured differential backscatter signal to a backscatter function. Depending on whether the diameter of the optical fibers is smaller or greater than the mean free path of photons in the sample, different backscatter functions are used.